



Technologies for creating and screening biological libraries at ultra high speeds

Jensen, Thomas Glasdam; Clausell-Tormos, Jenifer ; Christiansen, Anders ; Dietrich, Nikolaj ; Bouquin, Thomas ; Dufva, Martin

Published in:
Book of Abstracts. DTU's Sustain Conference 2015

Publication date:
2015

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Jensen, T. G., Clausell-Tormos, J., Christiansen, A., Dietrich, N., Bouquin, T., & Dufva, M. (2015). Technologies for creating and screening biological libraries at ultra high speeds. In *Book of Abstracts. DTU's Sustain Conference 2015* [Q-4] Technical University of Denmark.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

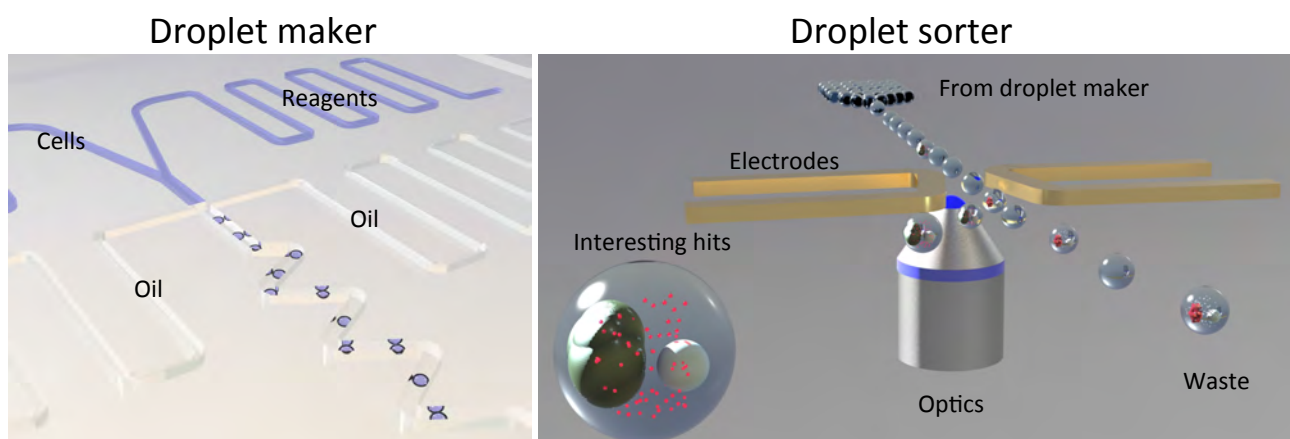
Technologies for creating and screening biological libraries at ultra high speeds.

Thomas Glasdam Jensen¹, Jenifer Clausell-Tormos², Anders Christiansen², Nikolaj Dietrich², Thomas Bouquin², Martin Dufva*¹

1: DTU Nanotech; 2: Symphogen A/S

*Corresponding author email: martin.dufva@nanotech.dtu.dk

Healthcare is central for a sustainable community. However, healthcare costs are increasing and recently medicine costs have become an increasingly large expense. The reason is that developing new medicine is risky and costly. Here we describe technologies to address high costs (and slow) traditional high throughput screening. In particular we focus on creating and screening biological libraries, which is central for Denmark being one of the world leaders of biotech for medicine and protein engineering. The technology described is based on microfluidics droplets. These miniaturized reaction vessels (about 50pL and upwards) are generated at 1000 fold higher speed than pipetting robots operates microtiter plates (current high throughput screening system). Application areas that we currently are working with is isolation of therapeutic antibodies (together with Symphogen A/S), single cells transcriptomics (together with Vet), isolation of high protein producing cells for isolation of production cell lines (together with Symphogen A/S and DTU Food respectively) and isolation of bacteria mutants controlling the pH of yoghurt. Assays not possible in FACS machines are possible using the droplet technology.



Droplet technology is based on a droplet maker that makes water droplets in oils at a speed of 2-20kHz (up to 20000 droplets per second). In this chips, cells and detection reagents is mixed and encapsulated. After a brief incubation off chip, droplets are reintroduced into a sorting chip placed in a fluorescent microscope. If the cell has a desired function, a fluorescent signal can be detected from the droplet and then sorted by pushing the droplet into another channel than the waste. The sorting is done at about 1000 drops per second.